Electronic Version
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Claims

[c1] 1. A method of manufacturing a low temperature polysilicon film, comprising the steps of:
forming a first metal layer on a substrate, a plurality of openings contiguous to the substrate being formed in the first metal layer;
forming a second metal layer on the first metal layer by performing an oblique evaporation and a hole being formed in the second metal layer corresponding to each of the openings;
forming a silicon layer on the second metal layer and a silicon seed being formed on the substrate inside each of the holes;
removing the first metal layer and the second metal layer;
forming an amorphous silicon layer on the substrate by using the silicon seed for performing a deposition process; and
transforming the amorphous layer to a polysilicon layer by performing a crystallization.

[c2] 2. The method of claim 1, wherein an angle of the oblique evaporation is in a range of about 10 degrees to

30 degrees.

[c3] 3. The method of claim 1, wherein the oblique evaporation is an electron beam evaporation.

[c4] 4. The method of claim 1, wherein the first metal layer is a bilayer metal layer structure.

[c5] 5. The method of claim 4, wherein a material of the second metal layer is the same as a material of a bottom layer of the bilayer metal layer structure.

[c6] 6. The method claim 5, wherein the material of both of the second metal layer and the bottom layer of the bilayer metal layer structure comprises aluminum.

[c7] 7. The method of claim 6, wherein the step of removing the second metal layer and the first metal layer comprises using phosphoric acid.

[c8] 8. The method of claim 1, wherein the step of forming the silicon seed on the substrate inside each of the holes comprises an electron beam evaporation.

[c9] 9. The method of claim 1, wherein a size of each of the silicon seed is in a range of about 0.5 μm to 1.0 μm.

[c10] 10. The method of claim 1, wherein the crystallization comprises a laser crystallization.

[c11] 11. The method of claim 1, wherein the step of forming an amorphous silicon layer comprises a chemical vapor deposition.

[c12] 12. A method of controlling a crystal seed position, comprising the steps of:
forming a first metal layer on a substrate wherein a plurality of openings contiguous to the substrate is formed in the first metal layer;
forming a second metal layer on the first metal layer by performing an oblique evaporation and a plurality of holes being formed in the second metal layer corresponding to the plurality of openings;
forming a crystal seed layer on the second metal layer and a silicon seed being formed on the substrate inside each of the holes; and
removing the first metal layer and the second metal layer.

[c13] 13. The method of claim 12, wherein an angle of the oblique evaporation is in a range of about 10 degrees to 30 degrees.

[c14] 14. The method of claim 12, wherein the oblique evaporation is an electron beam evaporation.

[c15] 15. The method of claim 12, wherein the first metal layer

is a bilayer metal layer structure.

[c16] 16. The method of claim 12, wherein a material of the second metal layer is the same as a material of a bottom layer of the bilayer metal layer structure.

[c17] 17. The method of claim 12, wherein the material of both the second metal layer and the bottom layer of the bilayer metal layer structure comprises aluminum.

[c18] 18. The method of claim 12, wherein the step of removing both of the second metal layer and the first metal layer comprises using phosphoric acid.

[c19] 19. The method of claim 12, wherein the step of forming the silicon seed on the substrate inside each of the holes comprises an electron beam evaporation.

[c20] 20. The method of claim 12, wherein a size of each of the silicon seed is in a range of about 0.5 μm to 1.0 μm.